



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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**Serial Number:** 10/083,095

**Filing Date:** 02/26/2002

**Applicant:** Carberry

**Title:** Network Healing Smart Fiber Optic Switch

**Docket Number:** 26308.01

**Examiner:** Alessandro Amari

**Art Unit:** 2872

**Customer Number:** 22465

**Declarant:** Reddy Urimindi

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**DECLARATION OF REDDY URIMINDI UNDER 37 C.F.R. § 1.132**

1. I, Reddy Urimindi, declare as follows, under penalty of perjury.
2. I hold a Ph.D. from Southern Methodist University, Dallas, Texas, awarded in 1993. I hold an MBA in Corporate Finance from University of Dallas, Texas. I hold an M.Tech in Electrical Engineering/Laser Technology from Indian Institute of Technology, Kanpur, India. I hold a B.Tech in Electrical Engineering from Nagarjuna University, India.
3. My position at Neptec Optical Solutions, Inc. at Richardson, Texas, is Vice-President of Marketing and Product Management. Since 1993 I have worked with various telecommunications and networking companies, including Lucent Technologies and Worldcom (formerly MCI). During my employment I have developed switch applications and worked with customer requirements. I am the inventor of four patents relating to fiber optics and optical networks. I am a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE).
4. I have reviewed Application Serial Number 10/083,095, filed on 02/26/2002, and titled "Network Healing Smart Fiber Optic Switch."

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5. I have reviewed United States Patent Number 5,060,305, titled "Self clocked, self routed photonic switch," and issued to Prucnal, et al., on October 22, 1991 (Prucnal).
6. Among the optical switching devices with which I was familiar prior to the filing date of Application Serial Number 10/083,095, were devices of the type shown in the patent listed in paragraph 5.
7. **Examiner's Statement Regarding Claims 1, 8, 9 and 14**
8. I have reviewed the U.S. Patent and Trademark Office action, Paper Number 6, which contains the following statement on page 2:

In regard to claims 1, 8, 9 and 14, Prucnal discloses (see Figure 1) an apparatus for switching a plurality of optical paths, said apparatus comprising a first splitter (22) having an input being a primary optical signal; a second splitter (24) having an input being a secondary optical signal; an analog selection circuit (10) having a first input from said first splitter and a second input from said second splitter, said analog selection circuit including a timing circuit responsive to said primary optical signal, and a deselect circuit responsive to said timing signal, said timing circuit initiated by receiving a valid primary optical signal, said timing circuit outputting a timing signal to said deselect circuit after a selected period in which said valid primary optical signal is present; and an optical switch (12) having a first switch input from said first splitter and a second switch input from said second splitter, said switch responsive to said analog selection circuit, which causes said optical switch to route said primary optical signal to an output of said optical switch upon receiving said timing signal as described in column 3, lines 16-68, column 4, lines 1-68 and column 5, lines 1-5.
9. The statement from the Examiner quoted in Paragraph 8 is incorrect, in view of the state of the optical switching art as of the filing date of Application Serial Number 10/083,095. The device disclosed by Prucnal is not as described by the Examiner, for the following reasons:
10. Prucnal discloses an optical router that routes a single optical signal to one of two output optical paths based on a coded signal contained in the input optical signal. Prucnal discloses an optical router that routes a single optical signal carried on an input fiber **16** to one of two output optical paths **56, 58** based on a coded signal contained in the input optical signal **16**. Prucnal, Col. 2, lines 13-18, Fig. 1. The optical routing controller **10** disclosed in Prucnal "decodes a message's destination

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address and sets the state of photonic switching element **12** accordingly." Col. 2, lines 61-63.

11. Prucnal discloses an optical signal input to the optical routing controller **10** carrying "a message containing an address frame . . . [which] is emplaced on fibers **18** and **20** by signal splitter **22**." Col. 3, lines 16-18. The optical signal on fiber **18** is split by a 1xN splitter **24**, which outputs optical signals through optical delays **30, 32, 34, 36, 38** and then through two summers **26, 28**. Col. 3, lines 21-38. The optical delay **38** decodes the message on the optical signal fed to the optical routing controller **10**. Col. 3, lines 28-33. The optical delays **34** and **36** decode messages on the optical signal fed to the optical routing controller **10** that are not to be re-routed. Col. 3, lines 35-38. Prucnal does not disclose a device having a plurality of optical inputs. Rather, Prucnal discloses a device that routes, or switches, a single optical input to one of two output paths.

12. Prucnal does not disclose an apparatus for switching a plurality of optical paths because Prucnal has only a single optical input **16**, which is routed between two output fibers **56, 58**. Prucnal, Fig. 1. The device disclosed by Prucnal is properly described as a an apparatus for switching an optical signal between two optical paths.

13. Prucnal discloses an apparatus having only a single optical input **16**. The optical input **18** to the 1xN splitter (the second splitter) **24** is the output of the 1x2 splitter (the first splitter) **22**. Prucnal, Fig. 1. Splitters function by dividing an input signal between one or more outputs. The output signals are identical to the input signals except for a decrease in intensity. The optical signal carried by fiber **18** has identical coding as the optical signal carried by fiber **16**. Accordingly, Prucnal does not disclose a secondary optical input to the 1xN splitter (the second splitter) **24**.

14. Prucnal discloses an optical routing controller **10** that receives a single input from fiber **18**. Prucnal's optical routing controller **10** is the portion of the router that provides the signal that actuates the photonic switching element **12**. The 1x2 splitter **22** divides the input optical signal on fiber **16** into an optical signal **18** supplied to the optical routing controller **10** and a routed optical signal **20** that passes through a delay buffer **14** and into the switching element **12**. Prucnal, Fig. 1.

15. Prucnal discloses a photonic switching element **12** that receives an optical input from the 1x2 splitter (the first splitter) **22**. The switching element **12** receives a control input from a flip-flop **52**, which causes the switching element **12** to change state. The 1xN splitter (the second splitter) **24** is not connected to the switching element **12**. Although the flip-flop **52** is in the optical routing controller **10** along with the 1xN splitter (the second splitter) **24**, the 1xN splitter (the second splitter) **24** has an optical output, whereas the flip-flop **52** has an electrical output that is matched to the switching element **12**. Accordingly, Prucnal does not disclose the photonic switching element **12** receiving an optical input from two splitters **22, 24**.

**16. Examiner's Statement Regarding Claims 2 and 3**

17. I have reviewed the U.S. Patent and Trademark Office action, Paper Number 6, which contains the following statement on page 3:

Regarding claims 2 and 3, Prucnal discloses that said timing circuit outputs a timing signal to said deselect circuit after a selected period in which said valid primary optical signal is present, said deselect circuit causes said optical switch to route said primary optical signal to an output of said optical switch on receiving said timing signal as described in column 3, lines 16-68, column 4, lines 1-68 and column 5, lines 1-5.

18. The statement from the Examiner quoted in Paragraph 17 is incorrect, in view of the state of the optical switching art as of the filing date of Application Serial Number 10/083,095. The device disclosed by Prucnal is not as described by the Examiner, for the following reasons:

19. Prucnal discloses several delay devices, including the optical delays **30, 32, 34, 36, 38** and the delay buffer **14**. Prucnal, Fig. 1, Col. 3, lines 16-38. The optical delays **30, 32, 34, 36, 38** serve to time-shift the optical signal in fiber **18** such that different portions of the optical signal arrive at the summer **26, 28** at the same time, thereby allowing the address information on the optical signal to be decoded. Col. 3, lines 1-38. The delay buffer **14** time-shifts the optical signal from fiber **20** an amount equal to the total processing time of the optical routing controller **10**. Col. 3, lines 18-21.

20. Timing circuits typically provide an output or cause an action to occur at a selected time after the circuit is initiated. The optical delays **30, 32, 34, 36, 38** and the delay buffer **14** disclosed in Prucnal do not have a point in time in which a timing cycle is initiated. Rather, the Prucnal devices continuously time-shift optical signals. Accordingly, the delay devices disclosed in Prucnal are not timing circuits as understood by one skilled in the art.

21. The optical delays **30, 32, 34, 36, 38** and the delay buffer **14** disclosed in Prucnal do not output a timing signal to the optical routing controller **10** after a selected period in which said valid primary optical signal is present. The apparatus of Prucnal is not concerned with valid optical signals, rather, Prucnal discloses routing an optical signal based on addressing information contained within the optical signal.

**22. Examiner's Statement Regarding Claims 4, 10 and 12**

23. I have reviewed the U.S. Patent and Trademark Office action, Paper Number 6, which contains the following statement on page 3:

Regarding claims 4, 10 and 12, Prucnal discloses a network including a resistor and a capacitor having a charging time defining a selected period before said primary optical signal is routed through said optical switch. Although the prior art does not specifically disclose the claimed resistor and capacitor network, this is seen to be an inherent teaching of that device since a timing circuit is disclosed and it is apparent that some that of resistor-capacitor network must be present for the switch to function as intended.

24. The statement from the Examiner quoted in Paragraph 23 is incorrect, in view of the state of the optical switching art as of the filing date of Application Serial Number 10/083,095. The device disclosed by Prucnal is not as described by the Examiner, for the following reasons:

25. Prucnal does not disclose a network including a resistor and a capacitor. The words "resistor" and "capacitor" do not appear in Prucnal, nor does the figures of Prucnal depict a resistor or capacitor. The only devices disclosed by Prucnal that relate to time are the optical delays **30, 32, 34, 36, 38** and the delay buffer **14** of Prucnal are devices that operate in the optical domain, not the electrical domain.

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26. The Examiner asserts that a resistor and capacitor network is inherent in a timing circuit. This is not true. Many examples of timing circuits exist in which resistors and capacitors are not used to control the time. For example, digital timing circuits are based on counting clock cycles. Many electrical time delay relays are pneumatic, that is, the preselected time is based on air exhausting through a port. Accordingly, a resistor and a capacitor are not inherent in the apparatus disclosed in Prucnal.

**27. Examiner's Statement Regarding Claims 5 and 13**

28. I have reviewed the U.S. Patent and Trademark Office action, Paper Number 6, which contains the following statement on page 3:

Regarding claims 5 and 13, Prucnal discloses said deselect circuit includes a network including a Schmitt trigger (50, 48) and a diode, said network causing said optical switch to route said primary optical signal upon actuation of said network by a timing signal from said timing circuit as shown in Figure 1 and as described in as described in column 3, lines 16-68 and column 4, lines 1-68.

29. The statement from the Examiner quoted in Paragraph 28 is incorrect, in view of the state of the optical switching art as of the filing date of Application Serial Number 10/083,095. The device disclosed by Prucnal is not as described by the Examiner, for the following reasons:

30. The apparatus disclosed in Figure 1 of Prucnal does not use a diode, although it does require two Schmitt triggers **48, 50**. Prucnal, Fig. 1, and Col. 3, lines 53-55. The apparatus disclosed in Figure 3 of Prucnal does not use a Schmitt trigger, although it does disclose optical amplifiers **150, 152** that are "appropriately biased laser diodes." Prucnal, Fig. 3, and Col. 4, line 68 to Col. 5, line 1. The Schmitt triggers **48, 50** disclosed in Figure 1 are mutually exclusive with the optical amplifiers **150, 152** disclosed in Figure 3.

31. Accordingly, Prucnal does not disclose an apparatus that uses both a Schmitt trigger and a diode in the same circuit.

**32. Examiner's Statement Regarding Claims 6 and 11**

33. I have reviewed the U.S. Patent and Trademark Office action, Paper Number 6, which contains the following statement on page 3:

Regarding claims 6 and 11, Prucnal discloses said analog selection circuit is responsive to an optical signal strength of said primary optical signal and is responsive to an optical signal strength of said secondary optical signal as described in column 3, lines 16-68, column 4, lines 1-68 and column 5, lines 1-5.

34. The statement from the Examiner quoted in Paragraph 33 is incorrect, in view of the state of the optical switching art as of the filing date of Application Serial Number 10/083,095. The device disclosed by Prucnal is not as described by the Examiner, for the following reasons:

35. As stated above, Prucnal does not disclose a primary optical signal and a secondary optical signal. Prucnal discloses a single optical signal carried on fiber **16**, which is split by the 1x2 splitter **22** and split again by the 1xN splitter **24** before being input into the optical routing controller **10**. Prucnal, Fig. 1.

36. The Examiner equates the analog selection circuit to the optical routing controller **10** of Prucnal. See para. 8. The optical routing controller **10** of Prucnal is responsive to a single optical signal, carried on fiber **18**, that has been split by 1xN splitter **24** into a plurality of identical optical signals, which are then delayed by optical delays **30, 32, 34, 36, 38**. The optical delays **30, 32, 34, 36, 38** are used to decode a coded signal, or address, carried in the single optical signal. Accordingly, the optical routing controller **10** of Prucnal is not responsive to a secondary optical signal.

**37. Examiner's Statement Regarding Claim 7**

38. I have reviewed the U.S. Patent and Trademark Office action, Paper Number 6, which contains the following statement on page 4:

Regarding claim 7, Prucnal discloses said analog selection circuit includes a means for routing said secondary optical signal after said primary optical signal becomes invalid a means for determining whether said primary optical signal has been valid for a selected period and a means for deselecting said secondary optical signal and routing said primary optical signal through said optical

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switch as described in column 3, lines 16-68, column 4, lines 1-68 and column 5, lines 1-5.

39. The statement from the Examiner quoted in Paragraph 38 is incorrect, in view of the state of the optical switching art as of the filing date of Application Serial Number 10/083,095. The device disclosed by Prucnal is not as described by the Examiner, for the following reasons:

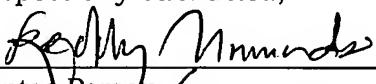
40. As stated above, Prucnal does not disclose both a primary optical signal and a secondary optical signal. Accordingly, Prucnal does not disclose "a means for routing said secondary optical signal after said primary optical signal becomes invalid" as asserted by the Examiner.

41. The device of Prucnal does not include "a means for determining whether said primary optical signal has been valid for a selected period" as asserted by the Examiner. Prucnal does not disclose determining the validity of an optical signal. Neither does Prucnal disclose an optical signal being valid for a selected period. The device of Prucnal determines whether to switch the single optical signal carried on fiber **16** between two output paths **56, 58** based on an address carried by the optical signal.

42. Prucnal does not disclose "a means for deselecting said secondary optical signal and routing said primary optical signal through said optical switch" as asserted by the Examiner. Because Prucnal does not route a secondary optical signal between the output paths **56, 58**, Prucnal cannot deselect the secondary optical signal.

43. Prucnal discloses a device that routes a single optical signal between two outputs. The statement from the Examiner quoted in Paragraph 38 describes a device that switches two optical signals to a single output. Accordingly, the statement from the Examiner quoted in Paragraph 38 is not correct.

Respectfully submitted,

  
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NeptecPerson (Reddy N. Urimindi)  
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11/17/03  
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Date